Astrid Boje | Curriculum Vitae

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Graduate chemical engineer with a dual masters in mathematics and scientific computing. Currently a Ph.D. student in the Computational Modelling group at the University of Cambridge, working with stochastic methods for solving population balance equations.

Experience

Work experience

- **Helmholtz Zentrum Dresden Rossendorf** — **Dresden, Germany**
  Intern in Experimental Thermal Fluid Dynamics — *June, 2014–August, 2014*

  3 month summer internship. Worked on a 1D, dynamic, multicomponent, compartment model for a slurry bubble column reactor for Fischer-Tropsch synthesis.

- **Mintek** — **Johannesburg, South Africa**
  Graduate Engineer in Measurement and Control — *January, 2013–July, 2013*

  6 month employment between South African undergraduate graduation and start of European Master's program. Worked in the Measurement and Control division. Researched the viability of thickener control and helped document models developed for the in-house control framework (written in C++). Contributed to on-site testing of a flotation reagent controller.

- **Mintek** — **Johannesburg, South Africa**
  Engineering intern in Measurement and Control — *December, 2011–January, 2012*

  8 weeks of vacation work and training as a compulsory component of a Bachelor's degree in Chemical Engineering and due requirements as a bursary student of the company. Developed a temperature-dependent amperometry model to be incorporated into an existing cyanide measurement technology.

Teaching experience

- **University of Cambridge** — **Cambridge, United Kingdom**
  Supervisor for Partial Differential Equations Course — *January, 2019–April, 2019*

  Small-group teaching and tutorials for students in the Part IIA year of the Chemical Engineering Tripos.

Academic qualifications

- **Churchill College, University of Cambridge** — **United Kingdom**
  Ph.D. Chemical Engineering — *2015–Current*

  My project involves using a Monte Carlo method (in-house code we use is written in C++) to solve population balance equations to study combustion synthesis of inorganic nanoparticles. I have developed a reactor model for the titanium dioxide process and I am currently working on numerical algorithms to improve performance of the stochastic solver under the industrial conditions.
  Doctoral thesis supervisor: Prof. Dr. Markus Kraft.

- **Technical University of Berlin (TUB)** **Germany**
  M.Sc. Scientific Computing, 1.2, "Sehr Gut" *2014–2015*
  The coursework covered control theory, differential algebraic equations, optimal control of partial differential equations, and model order reduction. My thesis was about convergence of stochastic coagulating particle systems. It was done with the Weierstrass Institute of Applied Analysis and Stochastics (WIAS).
  Masters thesis supervisors: Dr. Robert PATTERSON (WIAS) and Prof. Dr. Wolfgang KÖNIG (TUB, WIAS).

- **Royal Institute of Technology (KTH)** **Sweden**
  M.Sc. Mathematics, A, "Excellent" *2013–2014*
  The coursework covered stochastic differential equations, parallel and high-performance computing, fast numerical algorithms, mathematical modelling, finite element and finite volume methods, and non-linear optimisation.

- **University of Cape Town (UCT)** **South Africa**
  B.Sc. Eng. Hons. (Chemical Engineering), First Class *2009–2012*
  The coursework included mathematics, physics, chemistry, thermodynamics, numerical methods, process design, modelling, and control. I also took a post-graduate level course in optimisation. My honours project involved modelling Fischer Tropsch synthesis.
  Honours project supervisor: Prof. Dr. Klaus MOLLER.

Technical and personal skills

- **Programming Languages:** MATLAB/SCILAB, PYTHON, and C++. Basic proficiency with MPI/OpenMP and parallel programming.
- **Commercial software:** ASPEN HYSYS, COMSOL MULTIPHYSICS.
- **Opensource software:** waLBERLA (Widely Applicable Lattice-Boltzmann from Erlangen).
- **General:** Linux, Microsoft Windows, LaTeX, OpenOffice, Git.

Interests and extra-curricular activity

- Member of the **Cambridge University Ballet Club** (2015–2016, 2018–2019). Performed in the 2019 performance of Don Quixote.
- Member of the **Churchill College Boat Club** (2015–2016, 2018–2019). Rowed in the women's second boat in Michaelmas, Lent and May terms of 2015–2016. Sub for the women's first and second boats Michaelmas and Lent of 2018–2019 due to time constraints.

Achievements

- **Cambridge University Ph.D. Studentships** 2016–2019
  Cambridge Centre for Advanced Research and Education in Singapore (CARES)
  Chemical Engineering and Biotechnology Department
- **COSSE Double Masters Programme** 2013–2015
  Erasmus Mundus Scholarship
- **Mintek** 2011–2012
  Undergraduate Bursary
- **University of Cape Town, Faculty of Engineering** 2010–2012
  Dean's Merit List
- **University of Cape Town, Faculty of Engineering** 2009

Entrance Scholarship

- **Independent Examinations Board (IEB)** 2008
  Top 40 IEB Matriculants in South Africa
- **Our Lady of Fatima Convent School** 2008
  Matric DUX Student and subject trophies: English, Afrikaans, Bilingualism, Physics, Biology, Mathematics and Physics, History, Life Orientation
- **Kwa-Zulu Natal Youth Dance Company** 2006–2008
  Provincial ballet dancer.

Languages

- **English**: First language
- **Afrikaans**: Intermediate proficiency
- **Italian**: Basic proficiency (simple words and phrases only, A1&2 CEFR certificate)
- **German**: Basic proficiency (simple words and phrases only)
- **Swedish**: Basic proficiency (simple words and phrases only)

Publications

- Boje, A., Akroyd, J., Kraft, M., 2018. A hybrid particle-number and particle model for efficient solution of population balance equations. Submitted for publication.
- Boje, A., Akroyd, J., Sutcliffe, S., Edwards, J., Kraft, M., 2017. Detailed population balance modelling of TiO_2 synthesis in an industrial reactor. Chemical Engineering Science 164, 219–231. doi: 10.1016/j.ces.2017.02.019.

Conference talks

- Boje, A., Akroyd, J., Kraft, M., 2018. Numerical study of the evolution of particle size and morphology in an industrial titanium dioxide reactor. American Institute of Chemical Engineers (AIChE) Annual Meeting.

Conference posters

- Boje, A., Kraft, M., 2017. Computational study of temperature effects in TiO2 synthesis in an industrial reactor. Cambridge Particle Meeting.